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10/636,045	08/07/2003	James E. C. Brown	RAD344	9959

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EXAMINER	
ZHENG, EVA Y	
ART UNIT	**PAPER NUMBER**
2634	

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/636,045	BROWN ET AL.	
	Examiner	Art Unit	
	Eva Yi Zheng	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6-12,14,16-20* is/are rejected.

7)☒ Claim(s) *3,5,13 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The claims 7-9 and 17-19 rejected under 35 U.S.C. 112, second paragraph, have been withdrawn because of the amendment.

2. Applicant's arguments filed on October 4, 2004 have been fully considered but they are not persuasive. The Examiner has thoroughly reviewed Applicant's arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

a) Applicant's argument – Regarding claims 1and 11, Kuenen failed to teach or disclose an on-line incoming signal for computing correction coefficients.

Examiner's response – Although applicant disclose "on-line" in the background and summary, it did not give a precise and specific definition of what does it mean for "on-line". It is well known that in general an "on-line" refers to a communication system, for example, a telephone or a computer, being working. Thus, Examiner interpreted "on-line" as any wireless communication systems or networks (WLANs) as taught by Kuenen (background). Applicant is reminded that the Examiner is entitled to give the broadest reasonable interpretation to the language of claims. Therefore, Kuenen meet "on-line" claim limitation.

b) Applicant's argument – Regarding claims 1and 11, Kuenen failed to teach or disclose computing packet-fixed correction coefficients.

Examiner's response – Applicant merely disclose fixed correction coefficients in the summary of the invention (page 3, line 11-19). Applicant failed to further describe or

give more specific definition of "fixed" elsewhere in the specification. It is well known that a packet is a unit of data. Kuenen disclose a communication system wherein data being received inherent as a packet of data. Kuenen disclose a coefficient adapter (217 in Fig. 2), wherein coefficients are fixed during each time signal λ (page 4, Table 1). This is also shown in Fig. 4, where T1 and T2 maybe a fixed value (page 5, [0047] – [0051]). Applicant is reminded that the Examiner is entitled to give the broadest reasonable interpretation to the language of claims. Therefore, Kuenen meet "fixed correction coefficient" claim limitation.

c) Applicant's argument – Regarding claims 3, 5, 13 and 15, Kuenen filed to teach or disclose averaging pre-delayed I and Q signals and reducing DC offset from the delayed I and Q signals.

Examiner's response – Examiner withdraw rejections in view of Kuenen.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 7, 8, 9, 10, 11, 17, 18, 19, and 20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4, 5, 6, 8, 9, 12, 13, 14, and 16 of copending Application No. 10,350,622. Although the conflicting claims are not identical, they are not patentably distinct from each other because the broader application claims would have been obvious in view of the narrow claims, as follows:

a) Regarding claim 1,

resolving an on-line incoming signal into said I and Q signals;

computing (packet) fixed correction coefficients from said I and Q signals for a certain time period of said incoming signal; and

correcting at least one of I/Q gain and I/Q phase of said I and Q signals with said packet-fixed correction coefficients for providing corrected said I and Q signals for said packet

b) Regarding claim 7,

resolving an on-line incoming signal into said I and Q signals;

computing (packet) fixed correction coefficients from said I and Q signals for a certain time period of said incoming signal; and

correcting at least one of I/Q gain and I/Q phase of said I and Q signals with said packet-fixed correction coefficients for providing corrected said I and Q signals for said packet; and wherein

the step of computing (packet) fixed correction coefficients includes computing first and second correction coefficients using a finite number of indexed I values for said I signal and said finite number of indexed Q values for said Q signal; where

a first term includes a cross correlation of said I values and said Q values;

a second term includes an autocorrelation of said Q values;

a third term includes said first term divided by said second term;

a fourth term includes a sum of absolute values of said Q values;

a fifth term includes a sum of absolute values of a difference of said I values minus a product of said Q values times said third term; and

said first correction coefficient includes said fourth term divided by said fifth term.

c) Regarding claim 8,

said second correction coefficient includes the negative of said third term.

d) Regarding claim 9,

said second correction coefficient includes a negative of a product of said first correction coefficient and said third term.

e) Regarding claim 10,

demodulating said corrected I and Q signals for estimating data carried on said incoming signal.

f) Regarding claim 11,

a quadrature converter for resolving an on-line incoming signal into said I and Q signals;

an IQ coefficient calculator for computing (packet) fixed correction coefficients from said I and Q signals for a certain time period of said incoming signal; and

an IQ balancer for using said (packet-fixed) correction coefficients for correcting I/Q gain and I/Q phase of said I and Q signals after said certain time period and providing corrected said I and Q signals.

g) Regarding claim 17,

a quadrature converter for resolving an on-line incoming signal into said I and Q signals;

an IQ coefficient calculator for computing (packet) fixed correction coefficients from said I and Q signals for a certain time period of said incoming signal; and

an IQ balancer for using said (packet-fixed) correction coefficients for correcting I/Q gain and I/Q phase of said I and Q signals after said certain time period and providing corrected said I and Q signals and wherein:

the IQ coefficient calculator computes first and second said correction coefficients using a finite number of indexed I values for said I signal and said finite number of indexed Q values for said Q signal; where

a first term includes a cross correlation of said I values and said Q values;

a second term includes an autocorrelation of said Q values;

a third term includes said first term divided by said second term;

a fourth term includes a sum of absolute values of said Q values;

a fifth term includes a sum of absolute values of difference values, said difference values including said I values minus product values, said product values including said Q values times said third term; and

said first correction coefficient includes said fourth term divided by said fifth term.

h) Regarding claim 18,

said second correction coefficient includes the negative of said third term.

i) Regarding claim 19,

said second correction coefficient includes a negative of a product of said first correction coefficient and said third term.

k) Regarding claim 20,

a digital IQ signal receiver for demodulating said corrected I and Q signals for estimating data carried on said incoming signal.

Although copending Application No. 10,350,622. claims "fixed correction coefficients" instead of "packet-fixed correction coefficients" as in the current application, it is well known that a packet is a unit of data. In a wireless communication system data can be transmitted or received in many forms, including analog, digital, and a packet form. Therefore, it is obvious to one of ordinary skill in art that "packet-fixed" and "fixed" are inherently the same and cause claim confliction.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1,2, 4, 6, 10, 11, 12, 14, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuenen et al. (US 2004/0063416 A1).

a) Regarding claims 1, Kuenen et al. disclose a method for automatic I/Q balancing for packets of an incoming signal, comprising:

resolving said an on-line incoming signal into said I and Q signals (110 in Fig. 1);

computing fixed correction coefficients from said I and Q signals during a measurement section for a packet (211, 212, 214, 215, and 217 in Fig. 2); and

correcting at least one of I/Q gain and I/Q phase of said I and Q signals (235 in Fig. 2; Col 4, 0034) with said correction coefficients for providing corrected said I and Q signals (230 in Fig. 2).

Kuenen et al. discloses all of the subject matter as described above except for the specifically teaching of packets of signals.

However, a packet is a unit of data and it is well known in a communication receiver that the digital I and Q signals are received as packets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to recognize that the digital receiver by

Kuenen et al. receives, computes, and corrects packets signals.

b) Regarding claims 2 and 12, Kuenen et al. discloses the method / the receiver further comprising:

delaying said I and Q signals by at least said measurement section (318 in Fig. 3; Col 3, 0030); and wherein the step of correcting includes correcting said at least one of said I/Q gain and said I/Q phase of said delayed I and Q signals (210 and 230 in Fig. 2) with said packet-fixed correction coefficients for providing said corrected I and Q signals (as shown in Fig. 2).

d) Regarding claim 4, Kuenen et al. disclose

the step of correcting includes using said packet-fixed correction coefficients for correcting said at least one of said I/Q gain and said I/Q phase (235 in Fig. 2) for a portion of said packet only after said measurement section (318 in Fig. 3) of said packet for providing said corrected I and Q signals (as shown in Fig. 2).

e) Regarding claim 14, Kuenen et al. disclose

the IQ balance uses said packet-fixed correction coefficients for correcting said at least one of said I/Q gain and said I/Q phase (235 in Fig. 2) for a portion of said packet only after said measurement section (318 in Fig. 3) of said packet for providing said corrected I and Q signals (as shown in Fig. 2).

f) Regarding claim 11, Kuenen et al. disclose a signal receiver having automatic I/Q balancing for packets of an incoming signal, comprising;

a quadrature converter for resolving an on-line incoming signal into said I and Q signals (110 in Fig. 1);

an IQ coefficient calculator for computing fixed correction coefficients from said I and Q signals during a measurement section of a packet (211, 212, 214, 215, and 217 in Fig. 2); and

an IQ balancer for using said fixed correction coefficients for correcting at least one of I/Q gain and I/Q phase of said I and Q signals for providing corrected said I and Q signals. (230 in Fig. 2).

Kuenen et al. discloses all of the subject matter as described above except for the specifically teaching of packets of signals.

However, it is well known in a communication receiver that the digital I and Q signals are received as packets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to recognize that the digital receiver by Kuenen et al. receives, computes, and corrects packets signals.

g) Regarding claim 10, Kuenen et al. disclose the method of claim 1, further comprising:

demodulating said corrected I and Q signals for estimating data carried on said incoming signal (140 in Fig. 1; Col 3, 0026).

i) Regarding claim 6, Kuenen et al. disclose

the step of correcting said at least one of said I/Q gain and said I/Q phase is performed only after the step of computing said packet-fixed correction coefficients (as shown in Fig.2 and 3).

j) Regarding claim 16, Kuenen et al. disclose

the IQ balancer corrects said at least one of said I/Q gain and I/Q phase

only after the IQ coefficients calculator calculates said packet-fixed correction coefficients (as shown in Fig.2 and 3).

k) Regarding claim 20, Kuenen et al. disclose the receiver of claim 11, further comprising:

a digital IQ signal receiver for demodulating said corrected I and Q signals for estimating data carried on said incoming signal (140 in Fig. 1; Col 3, 0026).

Allowable Subject Matter

7. Claims 3, 5, 13 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Yi Zheng whose telephone number is (571) 272-3049. The examiner can normally be reached on 7:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-879-9306.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

December 28, 2004

Eva Yi Zheng
Examiner
Art Unit 2634

SHUWANG LIU
PRIMARY EXAMINER